



Process of Bamboo Boat making

Ethiopia | Madagascar | Tanzania



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Investing in rural people

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INTRODUCTION

Bamboo is known to have more than 1500 utilities. Being a versatile material, it is widely used as food and beverage (bamboo shoot and wine), feed and fodder (bamboo leaves), energy products (biomass, charcoal, briquettes / pellets), handicrafts utility products, furniture, pulp and paper, construction material, industrial panel products, bamboo fiber and textiles etc., in addition to sustenance uses.

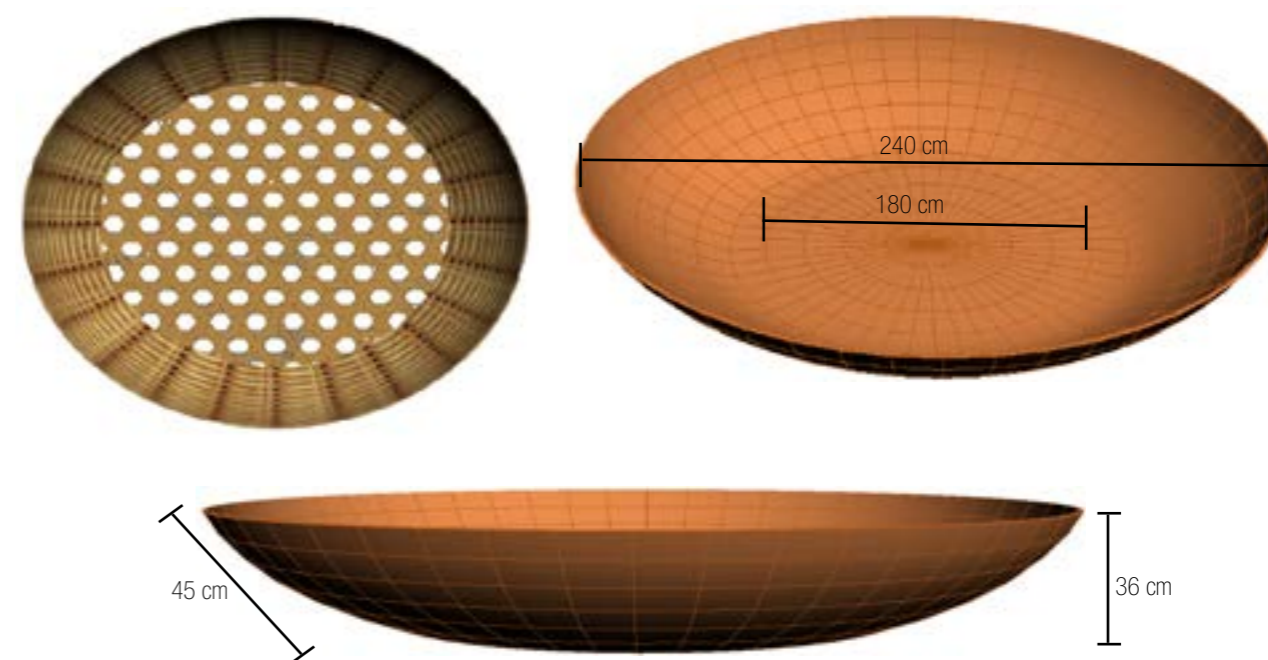
In many parts of the world, bamboo is also used as a mode of water transport (in the form of rafts, boats), for carrying people and goods. Bamboo boats are sturdy, light and can be easily used for transporting people and goods, both for upstream and downstream transport. Bamboo boats are an alternative to wooden boats, as making these boats causes no harm to the environment and prevents deforestation, which may otherwise occur.



Bamboo boats can be made into varying shapes and sizes depending upon the requirement. This technical bulletin focuses on making a circular bamboo boat (Coracle) of 8 feet or 240 cm diameter. However, by adopting the same techniques, boats of different sizes and forms can be produced.



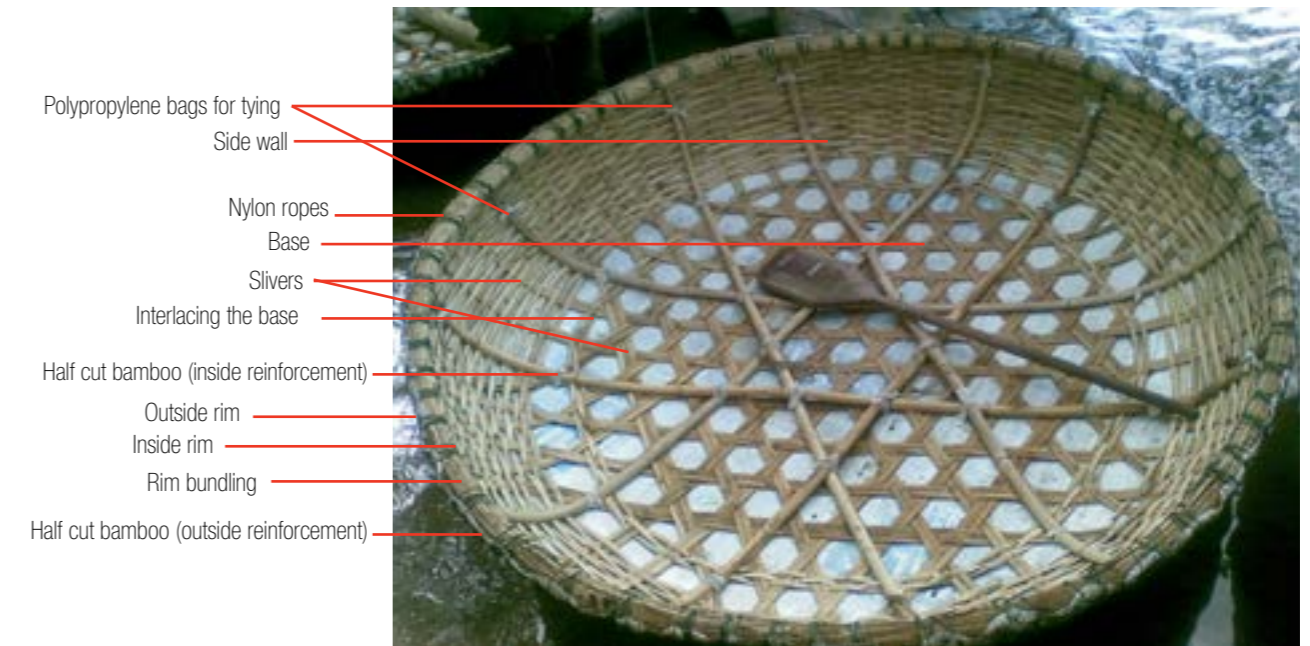
DIMENSIONS OF A MODEL BOAT



BILL OF MATERIALS

S. no	Materials	Visual	Dimensions	Quantity
1.	Slivers		360 cm Length X 2 cm Width X 2-3mm Thickness	150 nos. (Hexagonal bottom weaving and frame: 70 Nos.; Side wall weaving: 30 Nos.; Top rim bundling: 50 Nos.)
2.	Half cut bamboo		300 cm Length x 4-5 cm Width 360 cm Length x 4-5 cm Width	6 Nos (Inside reinforcement) 2 Nos (Outside rim)
3.	Nylon ropes		3 to 5 mm Diameter / thickness	100 meters
4.	Polypropylene bags		Approximately 90 cm Length and 60 cm Width	16 Nos.
5.	Coal tar (Bitumen)		Commonly known as coal tar used for making roads	10 litres

INDEX OF TERMS / GLOSSARY



STEP BY STEP PROCESS

HOW TO MAKE SLIVERS

Select mature bamboo poles and cross cut them to 12 feet length. Split and slice the bamboo poles into 2 cm wide and 2-3 mm thick slivers.



WEAVING PROCESS

Start weaving the base of boat in hexagonal pattern. While weaving, use 2 or 3 slivers as a single/one unit (warp and weft). After every four units of double slivers, use three slivers in a unit (warp / weft) for added strength. The weaving needs to be done in such a way that the central hexagonal grows outwards on all sides equally.



Note: Make hexagons with inner dimension of each side as 2 cm

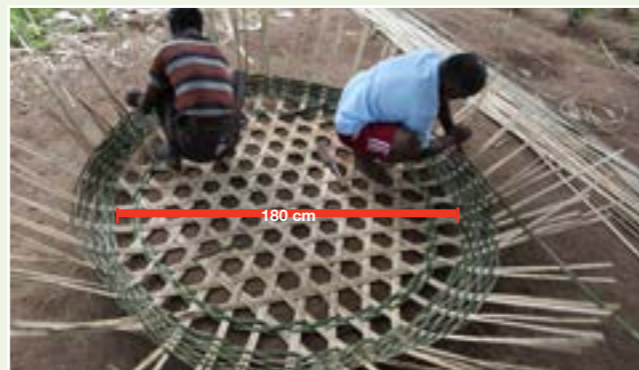


Once the count of hexagons reaches ten on all sides, use bamboo slivers for interlacing on the outer perimeter of the woven base in order to hold or retain the shape.



After tying or interlacing the outer perimeter (base of the boat), adjust the slivers (warp and weft) leave a gap of one hexagon around the newly formed circle and start weaving the sides / wall of the boat in one up & one down pattern.

Note: The diameter of the base is approximately 180 cm



While weaving the sides / wall of the boat, keep pulling the slivers (vertical frame - warp) inwards as well as weave the horizontal slivers (weft) tightly. Use a hammer to tighten the weaving in order to ensure that boat takes the desired shape.



Continue weaving the side wall until it reaches a vertical height of ~ 36 cm and an angular height of ~ 45 cm (approximately 25 rows of slivers).



Note: Use hammer/machete to maintain shape and uniformity.

INNER RIM / FRAME

Collate or assemble a bunch of 20 slivers to attain a collective thickness of 10-15 cm (to make the inside rim of the boat). Bundle them together with nylon ropes. The length of the bundled bunch of slivers should be sufficient to cover the entire inner circumference of the boat. This is necessary to ensure sturdiness and form of the boat. Tie the bundled bunch of slivers onto the inner circumference of the boat using nylon ropes.



Once the inside rim is tied to the boat, tie half cut bamboo on the outer perimeter of the boat to provide added strength, and to ensure that the boat can withstand wear and tear during use.



PREPARING OUTER WATER INSULATING LINING OF THE BOAT

Flatten / cut open empty polypropylene bags (cement/fertilizer/sugar bags etc.).



Stitch them together using nylon/plastic thread (approx 280 cm Length x 280 cm Width). Keep two such layers ready to make the outer water insulating lining of the boat. Alternatively hand stitching can also be done.



Spread the first layer of the stitched bags in an open space. Peg the corners and sides using wooden pegs to avoid shrinkages.



Melt the coal tar, once it reaches the bubbling stage; apply the hot tar uniformly on one side of the sheet. Use a mop / cloth tied to one end of a long pole/rod for applying coal tar.



Immediately after applying coal tar, place another sheet of similar size over the sheet smeared with coal tar, so that both the sheets are glued together. Press the sheets with hands to ensure binding and to avoid shrinkages.



TYING THE OUTER LINING TO THE BOAT FRAME

Spread open the two-layered outer water insulating lining on ground and place the boat frame over it. Ensure that the outer lining can cover the entire surface of the boat frame. Keep approximately 10 cm extra lining all over the circumference of the boat frame. Trim the extra lining / sheet.



Roll the extra outer lining to the height of boat frame. Use nail or a pointed tool to make holes in the insulating lining near the edges for tying it to the boat frame. Using the nylon rope, tie them tightly with the frame of the boat (inner rim and half cut bamboo on top).



Note: While tying, ensure that the outer lining is tight and devoid of any shrinkages.

REINFORCEMENT

For tightening every component of the boat and to ensure sturdiness of the boat, place 3 pairs (6 nos) of half cut bamboo (equidistant (diagonal) from each other) inside the hull of the boat.



Sharpen both the edges of the half cut (point of insertion). Insert the edges of half cut bamboo inside the inner rim of the boat. Push or apply force using machete to hammer on the half cut bamboo so that it penetrates and fits tightly inside the inner rim.



Tie the half cut bamboo used for reinforcement to the boat hull and frame using the cut strips of polypropylene bag (cement bag) at multiple locations to ensure that it remains in its position.



COAL TAR APPLICATION ON THE OUTER LINING

Melt the coal tar until it reaches the bubbling stage. Keep the boat upside down on a raised platform (stone / brick etc.) for easy application of coal tar. Firstly, dust clean the outer lining of the boat to remove any dust particles, soil etc. and then wash the outer lining of the boat with water.



Apply the heated tar evenly on the outer lining of boat. Ensure that there are no gaps in application of the coal tar on the outer lining.



DRYING

After application of coal tar, leave the boat for drying in sun for 8-10 hours to ensure that coal tar percolates and fills the micro-pores.



OPERATION

When the boat is being used, ensure that the weight is equally placed on all sides of the boat.



MAINTENANCE

The boat must always be stored in shade to avoid melting of coal tar (especially in high temperature locations).



In case of puncture or hole (due to hitting against rocky surface etc.), use polypropylene sheet patch and coal tar to repair it.



Additional benefits of a circular bamboo boat is its light weight which makes it easy to be carried to any location.



TYPES OF BAMBOO BOATS

Other options of bamboo boats are also available in different sizes and shapes

ROUND BOAT

Smaller size (6 ft diameter) of same model as discussed in this Technical Bulletin.



HEAVY TRANSPORT BOAT

Double layered weaving is done for making these heavy material transport boats.



PEA POD BOAT



ROOF BOAT





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